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**Optical conductivity of  $\text{Bi}_2\text{Sr}_2\text{CuO}_6$  in the optimally and overdoped regimes** R.P.S.M. LOBO, D. LYZWA, N. BONTEMPS, ESPCI-CNRS, Paris, France, Z.Z. LI, H. RAFFY, LPS, Université de Paris Sud, Orsay, France —  $\text{Bi}_2\text{Sr}_2\text{CuO}_6$  has a much lower critical temperature ( $T_c^{Max} \sim 20$  K) than other single layer cuprate superconductors, making this compound very useful to investigate normal state properties of cuprates. In addition, it is possible to oxygenate this material to a relatively high degree of overdoping ( $T_c < 5$  K). We measured, from room temperature to 5 K, the optical conductivity of the same  $\text{Bi}_2\text{Sr}_2\text{CuO}_6$  film thermally treated to be in the optimally and overdoped regimes. The in-plane resistivity in the optimally doped regime depends linearly on the temperature. It develops a positive curvature in the overdoped regime as expected from its more Fermi liquid like behavior. Surprisingly, despite its linear resistivity, the frequency dependent scattering rate in the optimally doped sample has a quadratic behavior. We will discuss our results in terms of the possible scenarios for the normal state conductivity and infer its effects on the superconducting state.

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